

MEDICAL, PHARMACY, AND SICK LEAVE COSTS FOR CONSTIPATION AND FOR IRRITABLE BOWEL SYNDROME WITH CONSTIPATION IN THE 6 MONTHS BEFORE AND AFTER DIAGNOSIS: An Employer Perspective

Nathan L. Kleinman, PhD¹, Richard A. Brook, MS^{2*}, Arthur K. Melkonian, MD¹, Robert W. Baran, PharmD³, and Nicholas J. Talley, M.D., Ph.D.⁴

¹Director, Research Services, HCMS, Cheyenne, WY, ²Head Retrospective Analysis, The JeSTARx Group, Newfoundland, NJ, United States, ³Sr. Manager, Global Health Economics Outcomes Research, Takeda Global Research and Development, Deerfield, IL and ⁴Chairman of Medicine, Mayo Clinic, Jacksonville, FL

Introduction

- Constipation and Irritable Bowel Syndrome with Constipation (IBS-C) impose substantial direct and indirect costs on the healthcare system and impair health-related quality-of-life.¹⁻⁵
- Recent research demonstrates:
 - The projected total incremental direct costs for constipation in all US employees is \$3.12 billion per year.³
 - The total direct costs in the US for healthcare encounters where constipation was the primary diagnosis exceeded \$235 million annually.⁴
 - Patients presenting for GI complaints within the Group Health Cooperative health system incurred annual mean costs of \$5049 for IBS and \$7522 for constipation.⁵
- Additional studies are needed to quantify the comparative costs of constipation and IBS-C.
- Similarities in costs for constipation and IBS-C suggest that both have a similar impact on the healthcare system.

AIM

- To examine the comparative direct and indirect cost burden of constipation and IBS co-occurring with constipation (IBS+C) for insured employees.

Methods

- A retrospective analysis was performed on data extracted from the Human Capital Management Services (HCMS) Research Reference Database consisting of approximately 510,000 employees representative of the US Employed Civilian Labor Force (2004).
- Patient healthcare claims from 1/1/2001 to 6/30/2006 were included in the analysis.
- Anonymity of person-level data was maintained according to the Health Insurance Portability and Accountability Act guidelines.
- Healthcare for the entire employee cohort was provided through managed care plans contracted by respective employers.
- International Classification of Diseases-9 (ICD-9) codes in claims records were used to identify employees with primary, secondary, or tertiary diagnoses of constipation:
 - 564.0 (Constipation)
 - 564.00 (Unspecified)
 - 564.01 (Slow Transit)
 - 564.09 (Other)
- ICD-9 codes in claims records were also used to identify employees with primary, secondary, or tertiary diagnoses of IBS:
 - 564.1 (IBS)
- IBS-C was represented by the condition where an ICD-9 for Constipation plus an ICD-9 for IBS were both present in the employee's claims records (IBS+C).
- Two cohorts were created for comparison purposes:
 - Constipation (C) cohort:
 - Employees with at least one record of constipation diagnosis (constipation ICD-9 codes listed above) and no ICD-9 for IBS.
 - Irritable Bowel Syndrome plus constipation (IBS+C) cohort:
 - Employees with at least one record of constipation diagnosis (constipation ICD-9 codes listed above) and at least one record of IBS diagnosis (ICD-9 for IBS).

- The index date in the C cohort was defined as the date of first diagnosis of constipation during 2001 or later as noted by ICD-9 code in the claims record.
- The index date in the IBS+C cohort was defined as the date of first diagnosis of IBS during 2001 or later as noted by ICD-9 code in the claims record.
- C and IBS+C cohorts were compared over the six months preceding and following the employee's index date.
- Employees were required to be continuously employed and eligible for health benefits for at least six months before and after their index date.
- The following outcomes measures were compared between C and IBS-C cohorts:
 - Per Member Per Month (PMPM) costs:
 - Direct Medical
 - Prescription Drug (Rx), and
 - Sick Leave
 - Semi-Annual (6 month) sick leave absence days.

Statistical Analysis

- For each employee in the IBS+C cohort, 5 C employees were matched using logistic regression and propensity scores for age, tenure (years with current employer), sex, marital status, race, exempt/nonexempt status (exempt employees are not paid on an hourly basis and are not paid for overtime work), full-time/part-time status, salary, Charlson Comorbidity Index score, 6 region (defined by first digit of employee's postal zip code), and existence of a direct medical claim.
- All costs were adjusted to 2006 dollars.
- Significance was measured by *t* tests at P≤0.05.
- Differences were explored for significance:
 - Between cohorts (C vs. IBS+C), for the:
 - 6 months prior to the index date,
 - 6 months after the index date, and
 - change (after – prior).
 - Within cohorts (6 months prior to index date vs. 6 months after index date).

Results

- Data were available for 309 IBS+C persons with constipation and 1,545 propensity-score matched C persons (Table 1).
- Following propensity score matching, no significant differences were observed between cohorts.
- Comparisons of PMPM costs (Table 2):
 - Between cohorts:
 - Prescription drug costs were \$26 higher (P≤0.05) PMPM for the IBS+C cohort than the C cohort in the period after diagnosis.
 - All other between group comparisons were non-significant (P>0.05).
 - Within cohorts:
 - Prescription drug costs were significantly increased (P≤0.05) both from the 6-months before to the 6-months after diagnosis for both IBS+C and C cohorts.
 - Direct medical costs were significantly increased (P≤0.05) both from the 6-months before to the 6-months after diagnosis for both IBS+C and C cohorts.

- Comparisons of Sick Leave time (Figure 1):

- Between cohorts:
 - Employees in the IBS+C cohort had 1.3 more sick leave days on average than employees in the C cohort (P≤0.05) during the 6-months after diagnosis.
 - All other between comparisons were non-significant (P>0.05)
- Within cohorts
 - Sick leave time increased from before diagnosis to after diagnosis in both IBS+C and C cohorts; however, no within group differences were significant.

Limitations

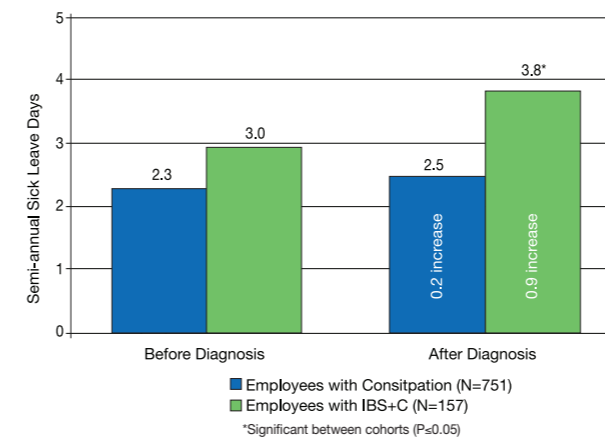
- Both Constipation and IBS+C may be underreported in healthcare databases due to ICD-9 coding anomalies.
- Cohorts were composed of continuously employed subjects, suggesting a relatively healthy population for analysis and the potential for underestimation of disease burden.

TABLE 1: Descriptive Statistics for Matched Cohorts of Employees with Constipation vs. Employees with IBS+C

Characteristic	Employees				Difference in Means
	with Constipation		with IBS+C		
	N	Mean [S.E.]	N	Mean [S.E.]	
Age (at index date), years	1,545	41.00 [0.27]	309	40.20 [0.59]	-0.80
Length of time working for employer (Tenure, at index date), years	1,545	8.71 [0.20]	309	8.45 [0.44]	-0.27
Female, %	1,545	73.8%	309	77.3%	3.6%
Married, %	1,411	50.4%	285	48.8%	-1.6%
Race:	1,187		239		
White, %		59.9%		62.8%	2.9%
Black, %		13.7%		12.1%	-1.6%
Hispanic, %		14.8%		13.4%	-1.4%
Exempt, %	1,545	30.4%	309	33.0%	2.6%
Full Time, %	1,545	94.1%	309	94.8%	0.7%
Annual Salary, US \$	1,545	\$48,900 [\$720]	309	\$49,676 [\$1,513]	\$775
Educational Level	253		72		
Less Than High School, %		0.8%		0.0%	-0.8%
High School Diploma or GED, %		41.9%		33.3%	-8.6%
Some College or Trade School, %		12.3%		12.5%	0.2%
Associate's or Trade School Degree, %		3.6%		6.9%	3.4%
Bachelor's Degree, %		29.6%		37.5%	7.9%
Master's Degree or MBA, %		8.7%		9.7%	1.0%
JD (Law Degree), %		0.4%		0.0%	-0.4%
PhD or MD or PharmD, %		2.8%		0.0%	-2.8%

All variables similar (P>0.05)
S.E. = Standard Error

FIGURE 1: Comparison of Semi-Annual Sick Leave Days per Employee



- The clinical diagnosis of IBS-C must be inferred from the operational definition of the IBS+C cohort.

Summary and Conclusions

- Both Constipation and IBS+C are associated with substantial direct cost (burden) of illness, which can be a large financial liability to employers.
- The only cost difference between groups was for prescription drugs which may be due to medications which are uniquely indicated for IBS+C.
- In the 6-months after diagnosis:
 - Costs increased significantly for both groups.
 - Absenteeism was higher for IBS+C.
- These results indicate an opportunity for improved management of patients with both constipation and IBS-C, which may result in reduced costs from an employer perspective.

Table 2: Per Member Per Month Medical Benefit Costs per Employee

Per Member Per Month Cost	Employees with Constipation		Employees with IBS+C		Constipation vs. IBS+C Between Cohort Difference in Means, \$ US
	N	Adjusted Mean Cost, \$ US	N	Adjusted Mean Cost, \$ US	
Before Diagnosis					
Direct Medical	1,545	450	309	499	-48
Prescription Drug	1,545	88	309	98	-10
Sick Leave	751	68	157	86	-18
Total		606		683	-76
After Diagnosis					
Direct Medical	1,545	689	309	623	66
Prescription Drug	1,545	107	309	134	-26†
Sick Leave	751	73	157	106	-33
Total		869		863	7
Change (After-Before)					
Direct Medical	1,545	238*	309	124*	114
Prescription Drug	1,545	19*	309	36*	-16
Sick Leave	751	5	157	20	-16
Total		262		180	82

† Significant Difference Between cohorts (P≤0.05)
* Significant Change within-cohorts (P≤0.05)

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NOTES

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ABSTRACT

Purpose: Both constipation (C) and irritable bowel syndrome with C (IBS+C) are known to be very costly. However, whether the costs of C are driven by the same factors that drive IBS+C costs is unknown. We aimed to assess the cost of illness (COI) for C without and with IBS (IBS+C) among US-based employee cohorts.

Methods: A retrospective analysis was conducted using the Human Capital Management Services Research database, which represents multiple US-based employers and contains employee health claims data from 2001-2005. Data included medical, pharmacy, payroll, work absence, and demographics. ICD9 Codes were used to include employees in the C cohort: 564.0 (Constipation), 564.00 (Unspecified), 564.01 (Slow Transit), and 564.09 (Other). Employees with C and an ICD9 for IBS (564.1x) at any time were included in the IBS+C cohort. Propensity scores based on demographics, job-related variables, region, existence of medical claims, and Charlson Comorbidity Index Score were used to match 5 C employees to each IBS+C cohort employee. For the C cohort the index date was the date of the first C claim. For the IBS+C cohort the index date was the date of the first IBS claim. Mean costs for each cohort were adjusted to 2006\$ and compared by category for medical, prescription drug (Rx), and sick leave costs in the 6-months before and after index diagnosis (dx).

Results: Data were available for 1854 employees. Demographics for both cohorts were similar (P>.05). All between cohort COI comparisons (Figure) were similar (P>.05), except for Rx costs after dx (\$26 higher for IBS+C, P=.0363). Within cohort comparisons (6-months before vs. after dx) identified significant increases in medical and Rx costs for both cohorts (P≤.05). Sick leave costs and days increased after dx in both C and IBS+C cohorts (P>.05). Persons with IBS+C averaged an additional 1.3 sick leave days during the 6-month period after dx when compared with the C cohort (P<.03).

Conclusion: Costs of illness for IBS+C and C are very similar. Total costs and sick leave days for both cohorts increased after dx.

Cost Category	Time (relative to DX)	Per-member-per-month			
		Constipation		IBS+C	
		N	Means Cost (\$)	N	Means Cost (\$)
Medical	Before	1,545	450	309	499
	After	1,545	689#	309	623#
Prescription Drug	Before	1,545	88	309	98
	After*	1,545	107#	309	134#
Sick Leave	Before	751	68	157	86
	After	751	73	157	106
Total	Before		606		683
	After		869		862

* Between cohorts P=0.0363

Within cohort (Before vs. After) P≤0.05